



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER OF PATENTS AND TRADEMARKS
Washington, D.C. 20231
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/654,078	09/01/2000	Jianmin Qiao	195425US77	5893

22850 7590 03/05/2003

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

PHAM, HOAI V

ART UNIT	PAPER NUMBER
----------	--------------

2814

DATE MAILED: 03/05/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/654,078

Applicant(s)

QIAO, JIANMIN

Examiner

Hoai V Pham

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 August 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 18 and 19 is/are pending in the application.
- 4a) Of the above claim(s) 19 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10, 18 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Election/Restriction

1. Newly submitted claim 19 is directed to an invention that is independent or distinct from the invention originally claimed for the following reasons: Applicant has been elected for prosecution on the merits Group I, claims 1-10, with traverse on Paper # 4. The new claim 19 is Group II, drawn to a method of forming an interconnect structure. Therefore, claim 19 is not under consideration. Since they are drawn to non-elected subject matter.
2. Since applicant has received an action on the merits for the originally presented invention, this invention has been constructively elected by original presentation for prosecution on the merits. Accordingly, claim 19 withdrawn from consideration as being directed to a non-elected invention. See 37 CFR 1.142(b) and MPEP § 821.03.

Information Disclosure Statement

3. The information disclosure statement (09/593,967; 09/593,968; 09/654,078) filed 10/17/00 has been considered.

Specification

4. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Rejections - 35 USC § 112

5. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

6. Claims 1-10 and 18 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 1, lines 7-8, and claim 18, the phrase "the etch stop layer comprises one member selected from a group consisting of an undoped silicon oxide and a **doped silicon oxide**" is not enabled because the specification described that the etch stop layer is an undoped silicon oxide.

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

8. Claims 1-10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1, line 9, the phrase "the other member of the group" renders the claim indefinite. It is not clear that the "other member of the group" is actually what member.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

10. Claims 1-5 and 9-10, as best understood, are rejected under 35 U.S.C. 102(e) as being anticipated by Chittipeddi et al. [U.S. Pat. 6,313,025] previously applied.

Chittipeddi et al. (figures 2-7, cols.2-4) discloses an interconnect structure comprising :

a contact dielectric layer (105) ;
an etch stop layer (110) over the contact dielectric layer;
a trench dielectric layer (115) over the etch stop layer; and
an electrically conductive (147, 145) in (i) a hole (125) through the contact dielectric layer and the etch stop layer, and (ii) a trench (135) in the trench dielectric layer, wherein the etch stop layer comprises one member selected from a group consisting of an undoped silicon oxide (see col. 3, lines 10-21); and
each of the contact dielectric layer and the trench dielectric layer independently comprises a doped silicon oxide (see col. 2, lines 59-67).

With respect to claim 2, Chittipeddi et al. discloses that the etch stop layer comprises an undoped silicon oxide (see col. 3, lines 20-21), the contact dielectric layer

comprises a first doped silicon oxide (see col. 2, lines 62-67) and the trench dielectric layer independently comprises a second doped silicon oxide (see col. 3, lines 23-25).

With respect to claim 3, Chittipeddi et al. discloses that the first and second doped silicon oxides independently further comprise at least one fluorine, boron and phosphorus (see col. 2, lines 62-67).

With respect to claim 4, Chittipeddi et al. discloses that the first and second doped silicon oxides are independently selected from the group consisting of a fluorosilicate glass, a borosilicate glass, a phosphosilicate glass, and a borophosphosilicate glass (see col. 2, lines 62-67).

With respect to claim 5, Chittipeddi et al. discloses that the trench (135) in the trench dielectric layer is wider than the hole (125) through the etch stop and contact dielectric layers (see figure 6).

With respect to claim 9, Chittipeddi et al. discloses that the electrically conductive interconnect (145) comprises a member selected from the group consisting of Al (see col. 4, lines 19-20).

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claims 6-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chittipeddi et al. [U.S. Pat. 6,313,025] previously applied, in view of White, Jr. et al. [U.S. Pat. 6,130,102] previously applied.

Chittipeddi et al. discloses that the substrate (100) comprises silicon (see col. 3, lines 1-5) and the integrated circuit also includes transistor (see col. 4, lines 34-35). Chittipeddi et al. does not particularly show that a gate structure comprises a gate dielectric over the substrate, a gate over the gate dielectric, a cap dielectric layer over the gate, and the spacers adjacent to the gate and the cap dielectric on the substrate in contact with the contact dielectric layer. However, White, Jr. et al. shows that it is conventionally in the art to form a gate structure comprises the gate dielectric (18) over the substrate (12), the gate (20) over the gate dielectric, the cap dielectric layer over the gate, and the spacers (24) adjacent to the gate and the cap dielectric, wherein the gate structure on the substrate in contact with the contact dielectric layer (28) (see figures 2-6, cols. 3-7). Therefore, it would have been obvious to the skilled in the art to form the cap dielectric over the gate and the spacers adjacent to the gate and the cap dielectric as taught by White, Jr. et al. into the device of Chittipeddi et al. to protect the gate.

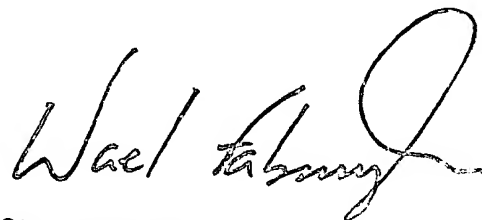
Conclusion

13. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hoai V Pham whose telephone number is 703-308-6173. The examiner can normally be reached on 6:30A.M. - 6:00P.M..

14. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael M. Fahmy can be reached on 703-308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7724 for After Final communications.

15. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

HP
Hoai Pham
March 2, 2003

A handwritten signature in cursive script, appearing to read 'Wael Fahmy', is written in black ink.

SUPERVISORY PRIMARY ENGINEER
TECHNOLOGY CENTER 2000